

TOROS ÜNİVERSİTESİ

Faculty Of Engineering
Computer And Software Engineering

Course Information

DIFFERENTIAL EQUATIONS					
Code	Semester	Theoretical	Practice	National Credit	ECTS Credit
		Hour / Week			
MAT203	Fall	4	0	4	5

Prerequisites and co-requisites	MAT 104 Mathematics II
Language of instruction	English
Type	Required
Level of Course	Bachelor's
Lecturer	Asst. Prof. Çağdaş ALLAHVERDİ
Mode of Delivery	Face to Face
Suggested Subject	None
Professional practise (internship)	None
Objectives of the Course	The objectives of this course are to introduce the student with the concept of a differential equation, basic techniques for solving certain classes of differential equations, especially those which are linear, and making connections between the qualitative features of the equation and the solutions. Connections to problems from the physical world are emphasized. As well as ordinary differential equations, the course aims to introduce the students to certain partial differential equations.
Contents of the Course	First order equations and various applications. Higher order linear differential equations. Power series solutions. The Laplace transform. Solutions of initial value problems. Systems of linear differential equations. Introduction to partial differential equations.

Learning Outcomes of Course

#	Learning Outcomes
1	Apply mathematics, science and engineering knowledge and experience to real world problems.
2	Design and execute experiments and analyze the results.
3	Identify engineering problems and suggest solutions.
4	Express himself freely and develop new ideas through communication.
5	Have the ability of time management and plan his professional development.
6	Perform his job willingly and in service of community.
7	Work with professional and ethical responsibility for the benefit of humanity.

Course Syllabus

#	Subjects	Teaching Methods and Technics
1	Definitions, terminology and initial value problems	Lecturing
2	First order differential equations: separable and linear equations	Lecturing
3	First order differential equations: exact equations	Lecturing
4	Modeling with first order differential equations: linear equations	Lecturing
5	Modeling with first order differential equations: nonlinear equations	Lecturing
6	Higher order differential equations: reduction of order, homogeneous linear equations, superposition and	Lecturing

	annihilator appr.	
7	Modeling with higher order differential equations: spring-mass systems, series circuit analogue etc.	Lecturing
8	Midterm Exam	Exam
9	Series solutions of linear equations	Lecturing
10	Matrix notation of differential equations	Lecturing
11	Laplace transform	Lecturing
12	Homogeneous linear systems	Lecturing
13	Nonhomogeneous linear systems	Lecturing
14	Numerical solutions of ordinary differential equations: Euler methods	Lecturing
15	Numerical solutions of ordinary differential equations: Runge-Kutta method	Lecturing
16	Final Exam	Exam

Course Syllabus

#	Material / Resources	Information About Resources	Reference / Recommended Resources
1	Dennis G. Zill, A First Course in Differential Equations with Modeling Applications, 10th Edition, ISBN-13: 978-1-111-82705-2 ISBN-10: 1-111-82705-2, 2012.		

Method of Assessment

#	Weight	Work Type	Work Title
1	40%	Mid-Term Exam	Mid-Term Exam
2	60%	Final Exam	Final Exam

Relationship between Learning Outcomes of Course and Program Outcomes

#	Learning Outcomes	Program Outcomes	Method of Assessment
1	Apply mathematics, science and engineering knowledge and experience to real world problems.	1	1,2
2	Design and execute experiments and analyze the results.	1	1,2
3	Identify engineering problems and suggest solutions.	1	1,2
4	Express himself freely and develop new ideas through communication.	1	1,2
5	Have the ability of time management and plan his professional development.	1	1,2
6	Perform his job willingly and in service of community.	1	1,2
7	Work with professional and ethical responsibility for the benefit of humanity.	1	1,2

PS. The numbers, which are shown in the column Method of Assessment, presents the methods shown in the previous table, titled as Method of Assessment.

Work Load Details

#	Type of Work	Quantity	Time (Hour)	Work Load
1	Course Duration	14	4	56
2	Course Duration Except Class (Preliminary Study, Enhancement)	14	4	56
3	Presentation and Seminar Preparation	0	0	0
4	Web Research, Library and Archival Work	0	0	0
5	Document/Information Listing	0	0	0
6	Workshop	0	0	0

7	Preparation for Midterm Exam	0	0	0
8	Midterm Exam	1	3	3
9	Quiz	0	0	0
10	Homework	4	8	32
11	Midterm Project	0	0	0
12	Midterm Exercise	0	0	0
13	Final Project	0	0	0
14	Final Exercise	0	0	0
15	Preparation for Final Exam	0	0	0
16	Final Exam	1	3	3
				150